

## CLAIMS

What is claimed is:

1. A long retracting sootblower device for conducting a plurality of cleaning media types to the interior of a heat exchanger of the type having a lance tube assembly, a feed tube, a carriage assembly for moving the lance tube assembly relative to the feed tube, a first cleaning media supply, and a second cleaning media supply, wherein said lance tube assembly comprises:

⇒ a hub assembly in fluid communication with <sup>the</sup> said first cleaning media supply, a tube section extending outward from said hub;

- 10 a nozzle assembly mounted to a distal end of said tube section, said nozzle assembly including one or more nozzles adapted for directing a stream of cleaning media into the narrow passages of said heat exchanger;

said hub assembly including at least one cylindrical tube with a first end and a second end, said first end of said cylindrical tube being mounted to said hub assembly, and said second end of said cylindrical tube engaging said nozzle assembly, said hub assembly and said cylindrical tube defining a first high pressure passage for conducting cleaning media from said first cleaning media supply to said nozzle assembly; and

said hub assembly further including a shield assembly for supporting said cylindrical tube within said tube section.

- 20 2. The sootblower device as set forth in claim 1, wherein said nozzle assembly includes a seal assembly for providing sealed sliding engagement between said second end of said cylindrical tube and said nozzle assembly while accommodating movement of said second end of said cylindrical tube relative to said nozzle assembly.

3. The sootblower device as set forth in claim 2, wherein said nozzle assembly includes one or more first nozzles and one or more second nozzles, both said first and second nozzles being adapted for directing a stream of cleaning media.

4. The sootblower device as set forth in claim 3, further including a second high pressure passage for conducting cleaning media from said second cleaning media supply to said nozzle assembly;

30 said nozzle assembly including one or more outer passages in fluid communication with said first nozzles for conducting cleaning media from said first high pressure passage to said first nozzles, and a central passage in fluid communication with said second nozzles for conducting cleaning media from said second high pressure passage to said second nozzles.

35 5. The sootblower device as set forth in claim 4, wherein said hub and tube section of said lance tube assembly are cylindrical in shape and hollow, and said second high pressure

passage being defined by the inner walls of said hub and said tube section of said lance tube assembly.

5 6. The sootblower device as set forth in claim 5, including a feed tube for communicating cleaning media from said second cleaning media supply to said second high pressure passage, wherein said feed tube is mounted stationary with respect to the heat exchanger and telescopes within said lance tube assembly as said lance tube assembly is stroked into and retracted from the heat exchanger.

10 7. The sootblower device as set forth in claim 6, wherein said nozzle assembly includes a distal end and a near end, said near end being attached to said tube section, said outer passage of said nozzle assembly extending between said near end and said distal end through said nozzle assembly and including an inner shoulder located adjacent said near end and a plug threadingly engaged within said outer passage adjacent said distal end, said plug including passages for conducting cleaning media to said first nozzles, said seal assembly comprising rings of a compressible material which are stacked and compressed between said inner  
15 shoulder and said plug.

8. The sootblower device as set forth in claim 7, including a removable cover plate mounted to said distal end of said nozzle assembly for removably securing said plug within said outer passage.

20 9. The sootblower device as set forth in claim 8, wherein said manifold includes an adaptor for connecting to said first cleaning media supply.

10. The sootblower device as set forth in claim 9, wherein said first nozzles are low dispersion water nozzles, and said second nozzles are converging/diverging steam nozzles.

11. A long retracting sootblower device for conducting a plurality of cleaning media types to the interior of a heat exchanger having a lance tube assembly, a feed tube, a carriage assembly, a first cleaning media supply, and a second cleaning media supply, wherein said lance tube assembly comprises:

5 a manifold for adapting to said first cleaning media supply, a hub mounted to said manifold, a first tube section extending outward from said hub, a first nozzle assembly mounted to a distal end of said tube section, a second tube section mounted to said first nozzle assembly opposite said first tube section, and a second nozzle assembly mounted to a distal end of said second tube section;

10 each of said nozzle assemblies including one or more nozzles adapted for directing a stream of cleaning media into the internal passages of said heat exchanger;

said first nozzle assembly having at least one cylindrical tube with a first end and a second end, said first end of said cylindrical tube being permanently mounted to said first nozzle assembly, and said second end of said cylindrical tube engaging said second nozzle assembly, said cylindrical tube defining a first high pressure passage for conducting cleaning media from  
15 said first nozzle assembly to said second nozzle assembly;

said first nozzle assembly further including a shield assembly extending therefrom for supporting said cylindrical tube within said second tube section.

20 ~~said lance tube assembly~~ said lance tube assembly further including a third high pressure passage for conducting cleaning media from said first cleaning media supply to said first nozzle assembly.

12. The sootblower device as set forth in claim 11, including a cylindrical sleeve extending between said manifold and said first nozzle assembly, said sleeve having a diameter smaller than said hub and said tube section, wherein said third high pressure passage is defined by the annular space between an inner wall of said lance tube and an external wall of said sleeve.  
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13. The sootblower device as set forth in claim 12, wherein said second nozzle assembly includes a seal assembly for providing sealed sliding engagement between said second end of said cylindrical tube and said second nozzle assembly while accommodating movement of said second end of said cylindrical tube relative to said second nozzle assembly.

30 14. The sootblower device as set forth in claim 13, wherein each of said first and second nozzle assemblies include one or more first nozzles and one or more second nozzles, said first and second nozzles being adapted for directing a stream of cleaning media.

15. The sootblower device as set forth in claim 14, further including a fourth high pressure passage for conducting cleaning media from said second cleaning media supply to  
35 said first nozzle assembly, said fourth high pressure passage defined by the inner wall of said sleeve;

said second nozzle assembly including one or more outer passages in fluid communication with said first nozzles for conducting cleaning media from said cylindrical tube to said first nozzles, and a central passage in fluid communication with said second nozzles for conducting cleaning media from said second high pressure passage to said second nozzles;

5        said first nozzle assembly including one or more outer passages in fluid communication with said first nozzles and said cylindrical tube for conducting cleaning media from said third high pressure passage to said first nozzles and said cylindrical tube, and a central passage in fluid communication with said second nozzles and said second high pressure passage for conducting cleaning media from said fourth high pressure passage to said secondary nozzles and said  
10        second high pressure passage.

16. The sootblower device as set forth in claim 15, including a feed tube for communicating cleaning media from said second cleaning media supply to said fourth high pressure passage, wherein said feed tube is mounted stationary with respect to the heat exchanger and telescopes within said fourth high pressure passage as said lance tube is  
15        stroked into and retracted from the heat exchanger.

17. The sootblower device as set forth in claim 16, wherein said second nozzle assembly includes a distal end and a near end, said near end being mounted to the distal end of said second tube section, said outer passage of said second nozzle assembly extending between said near and distal ends through said second nozzle assembly and including an inner  
20        shoulder located adjacent said near end of said second nozzle assembly and a plug threadingly engaged within said outer passage adjacent said distal end of said second nozzle assembly, said plug including passages for conducting cleaning media to said first nozzles, and said seal assembly comprising rings of a compressible material which are stacked and compressed between said inner shoulder and said plug.

18. The sootblower device as set forth in claim 17, including a removable cover plate mounted to said distal end of said second nozzle assembly for removably securing said plug within said outer passage of said second nozzle assembly.

19. The sootblower device as set forth in claim 18, wherein said hub includes an adaptor for connecting said third high pressure passage to said first cleaning media supply.

20. The sootblower device as set forth in claim 19, wherein said sleeve includes a first end and a second end, said second end permanently mounted to said first nozzle assembly, and said first end engaging said hub.

21. The sootblower device as set forth in claim 20, wherein said hub includes a sleeve seal assembly for providing sealed sliding engagement between said first end of said sleeve and said hub while accommodating movement of said first end of said sleeve relative to said hub.

22. The sootblower device as set forth in claim 21, wherein said hub includes an annular inner shoulder, and said manifold includes an annular face, said sleeve seal comprising rings of

a compressible material which are stacked and compressed between said annular inner shoulder of said hub and said annular face of said manifold.

23. The sootblower device as set forth in claim 22, wherein said first nozzles are low dispersion water nozzles, and said second nozzles are converging/diverging steam nozzles.

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